December 1979

Ground Squirrels in the Great Plains

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There are 22 recognized species of ground squirrels in North America (Jones et al. 1975). All belong to the genera Spermophilus or Ammospermophilus. Some species contain as many as 14 subspecies, or races. In many cases, these subspecies are distinguished not only by morphological or distributional characters, but by behavioral differences and varying ecological strategies, as well. These latter frequently impact on the efficacy of various control methods.

Currently, six species of ground squirrels are of sufficient economic importance to justify regular control efforts within some parts of their ranges: Richardson's ground squirrel (Spermophilus richardsonii), the California ground squirrel (Spermophilus beecheyi), the Columbian ground squirrel (Spermophilus columbianus), Belding's ground squirrel (Spermophilus beldingi), Townsend's ground squirrel (Spermophilus townsendii), and the Uinta ground squirrel (Spermophilus armatus). Within the Great Plains region, damages are most frequently associated with infestations of Richardson's ground squirrel (Figure 1) and the Uinta ground squirrel (Figure 2). Other species in the Great Plains which occasionally require control include the antelope ground squirrels (Ammospermophilus sp.), thirteen-lined ground squirrel (Spermophilus tridecemlineatus), and the rock squirrel (Spermophilus variegatus).

Ground Squirrel Infestation and Damage

Richardson's Ground Squirrel. Montana reports more damages to agricultural and rangeland enterprises from this squirrel than any other state (Table 1). In 1973, this animal was blamed for over $4,700,000 of losses in rangelands and croplands (Seyler 1977). These estimates were derived from a mail survey of producers in 50 counties of Montana in which ground squirrels have traditionally been a significant agricultural problem. Based on the amount of strychnine bait used for Richardson's ground squirrel infestations in Montana in 1978, approximately 64,500 acres of rangelands were treated to control this rodent. In Colorado, Terrell (1979) reports that virtually all the private lands in high elevations are infested with this squirrel and puts the total acreage of infested lands throughout the state at over 10,000,000 acres. Boddicker (1979) reports that Richardson's ground squirrels are a problem on approximately 500,000 acres of private lands. Colorado treats approximately 130,000-150,000 acres to control Richardson's ground squirrels each year. Mork (1979) has reported forage losses of 20-30 percent on rangelands in North Dakota totalling approximately 1000 acres. This squirrel is widely distributed in North Dakota north and

[1]Presented at the Great Plains Wildlife Damage Control Workshop, Manhattan, Kansas, December 4-6, 1979.

east of the Missouri River and is generally regarded as a problem (or a potential problem). However, present infestation rates throughout most of its range in North Dakota are low and treatments are limited to small problem areas (Grondahl 1979).

Uinta Ground Squirrel. This squirrel is the other "major" problem ground squirrel occurring in the Great Plains states. Although the Uinta ground squirrel is not a "plains" squirrel, its occurrence in some of the western plains states often leads to the need for control efforts by wildlife damage control specialists in those states. Most of the problems with this squirrel on rangelands occur in the intermountain regions, especially Utah. However, Montana reports that this squirrel has become a growing problem in at least 3 counties in the central part of the state. Very little information is available as to infestation rates or the extent to which this squirrel is responsible for economic losses to producers throughout its range.

Other ground squirrels. In the southern portions of the Great Plains, ground squirrel problems have been less frequent. In Nebraska, very few requests for assistance with ground squirrel problems are received each year (Kelley 1979). Kansas has experienced some problems in localized areas with ground squirrels in corn and other crops grown under center-pivot irrigation systems in the western part of the state (Boggess 1979). Oklahoma receives 'one or two" requests for assistance with ground squirrel problems each year, mostly in the southwestern part of the state. Texas occasionally receives requests for assistance with ground squirrels in croplands, but does not regard ground squirrels to be a significant rangeland problem.

Ground Squirrel Treatments

Because ground squirrels are not regarded as one of the major pest problems among vertebrates in the Great Plains region, the list of treatment alternatives is somewhat limited (Table 2). The only federally registered acute toxicant approved for use with ground squirrels is strychnine. Strychnine is generally considered to be an efficacious treatment for use with Richardson's ground squirrel , either on grain or green baits. Its use in the Great Plains is almost entirely restricted to grain baits. As with, most ground squirrels, timing is most important in obtaining effective control. A small squirrel (such as Richardson's) is more effectively controlled by the 0.35 and 0.50 percent strychnine bait formulations which are currently available. In addition, Richardson's characteristically pouches its grain (if treated at the proper time of year) and this makes it even more susceptible to strychnine. Uinta ground squirrels in Montana have proven 'resistant" to strychnine and the results of strychnine treatments with this squirrel seem to be erratic (Seyler 1979). However, most of the smaller ground squirrels common in the southern Great Plains are effectively treated with strychnine grain baits.

Compound 1080 is currently used only in Colorado (among the Great Plains states). In recent years, Colorado's rodent control programs have treated 65,000-130,000 acres per year for control of Richardson's ground squirrels. Up to 100,000 acres of these treatments have employed 1080 baits and it remains the primary means of treating ground squirrels in Colorado.

Of the anticoagulants, only diphacinone is a registered alternative within the Great Plains and its use is limited to Colorado, Montana and Wyoming. Anticoagulants are not generally regarded as a feasible alternative for the control of ground squirrels on rangelands.

Several fumigants (gas cartridges, carbon disulfide, paradichlorobenzene and carbon tetrachloride) are registered for use with ground squirrels, but these are of limited use in rangeland infestations. Thiram is the only federally registered repellant and it, too, is of limited use in rangeland situations.

The data used in this report were acquired during an investigation conducted for the Development Planning and Research Associates, Incorporated, Manhattan, Kansas. Their permission to use this information is greatly appreciated.

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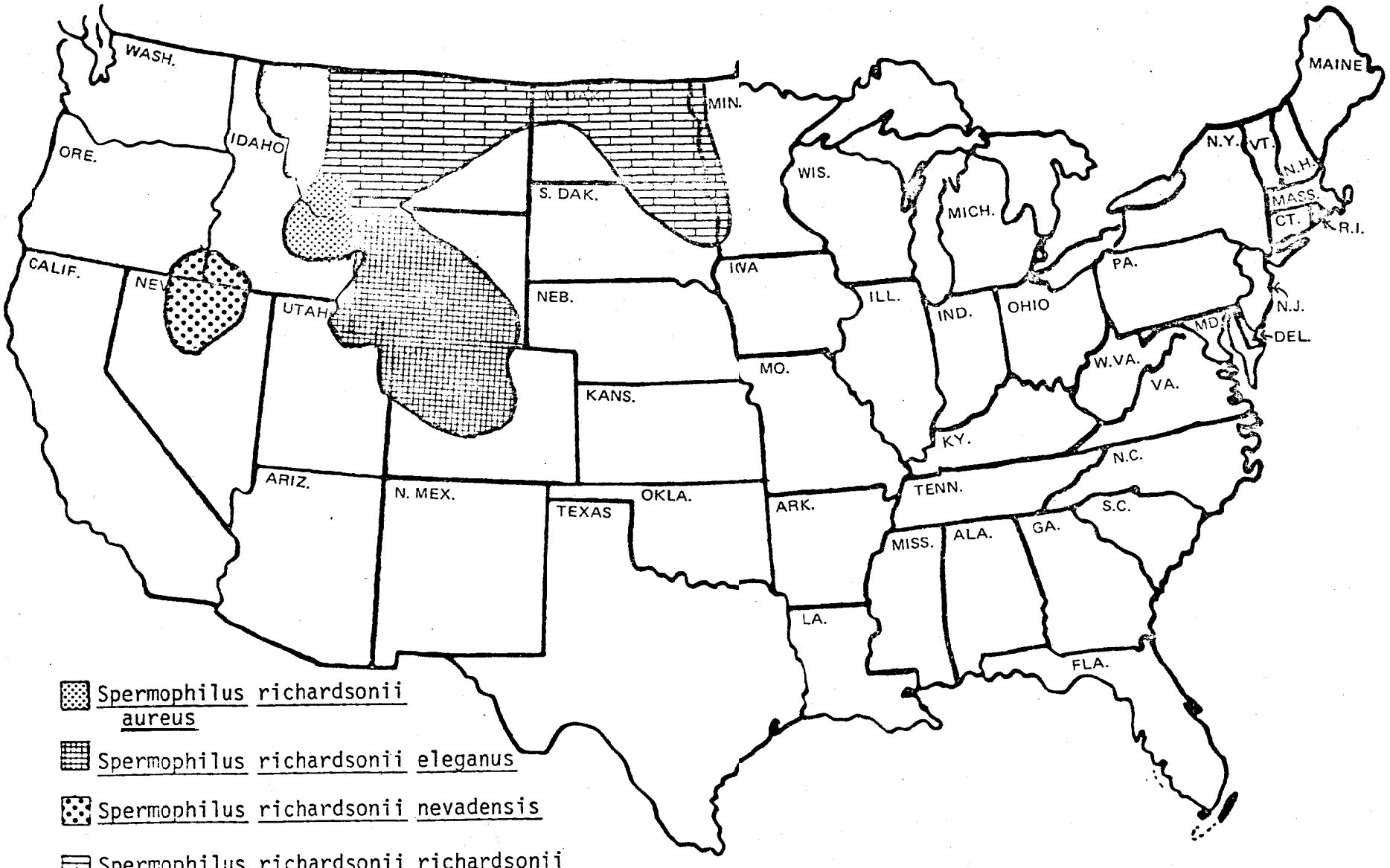
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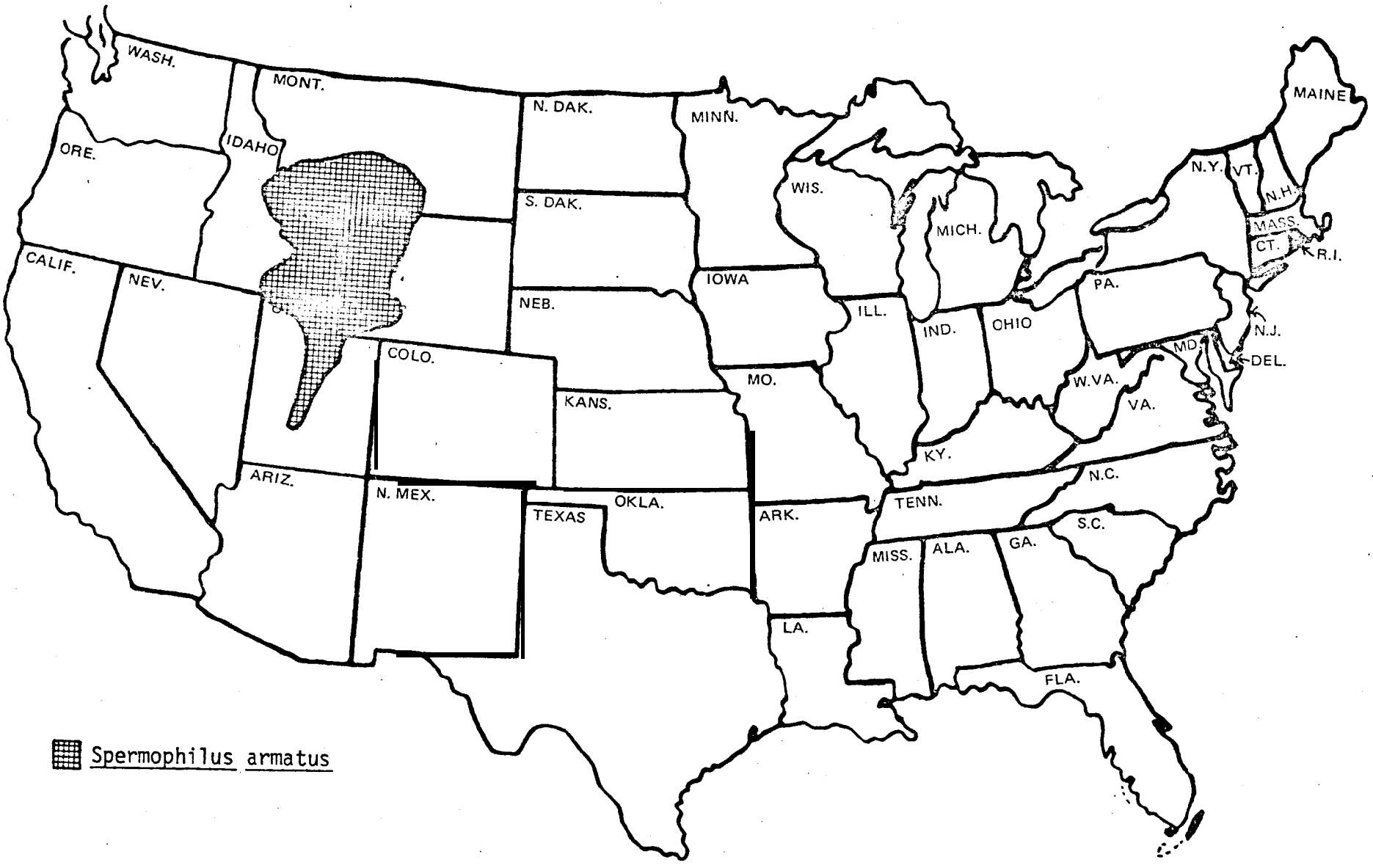
Spermophilus richardsonii aureus
Spermophilus richardsonii eleganus
Spermophilus richardsonii nevadensis
Spermophilus richardsonii richardsonii

FIGURE 1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Spermophilus armatus

FIGURE 2

TABLE 1

RANGELAND GROUND SQUIRRELS - INFESTATION/DAMAGE

Source	Location	Crop	Ac. Inf.	Ac. Trt.	% Loss	%	Year
Terrell, 1979	CO	R-P	10,000,000	130,000-150,000	10-90%	---	1978
Ahlstrum, 1979	ID	R-P	27,400	---	---	---	1979
Seyler, 1979	MT	R-P	61,423	---	---	---	1979
Seyler, 1979	MT	R-P	246,000	26,190	---	---	1979
Mork, 1977	ND	R-P	1,260,000	1,000	20-30%	---	1976

TABLE 2

CHEMICAL ALTERNATIVES TO STRYCHNINE

	Ground Squirrels
Site:	Near Burrows
Acute Toxics	
1080[1]	NV, CA, CO
Zinc phosphide[2]	CA, NV
Endrin[1]	
Vacor	
Strychnine	F
Repellents	
Hinder	
Thiram	F
Fumigants	
Gas cartridges	F
Carbon disulfide	F
Paradichlorobenzene	F
Dichlorobenzene	
Methyl bromide	CA, NV
Calcium cyanide	
Carbon tetrachloride[1]	F
Anti-coagulants	
Pival	CA
Fumarin	CA
Diphacinone	NV, CO, WY, AZ, UT,[5] CA, OR, ID, MT, WA
Chlorophacinone	CA, ID
Warfarin	CA
PMP	
Talon[3]	
Maki[3]	

[1] RPAR Chemical

F: Federally Registered

[2] May also be used as a tracking powder.

[3] For experimental use only, registration expected.

[4] Registered only for the black-tailed and white-tailed prairie dog.

[5] Registered under 24c permit.

Source: EPA files.